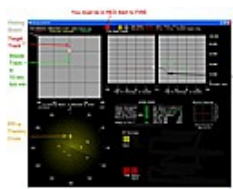




[Return to main page](#)

# A Nike Simulation "Game" - IFC Area

**and explanation of radar display and plotting board displays in the Battery Control van.**  
**The radar displays in the Radar Control van are for reference only, not displayed.**  
**by Ed Thelen**

**September 30, 2018 update** - no setup required, starts with click of your mouse :-)  
[Click here](#) to start the Battery Control Van simulation of this Nike "Game".

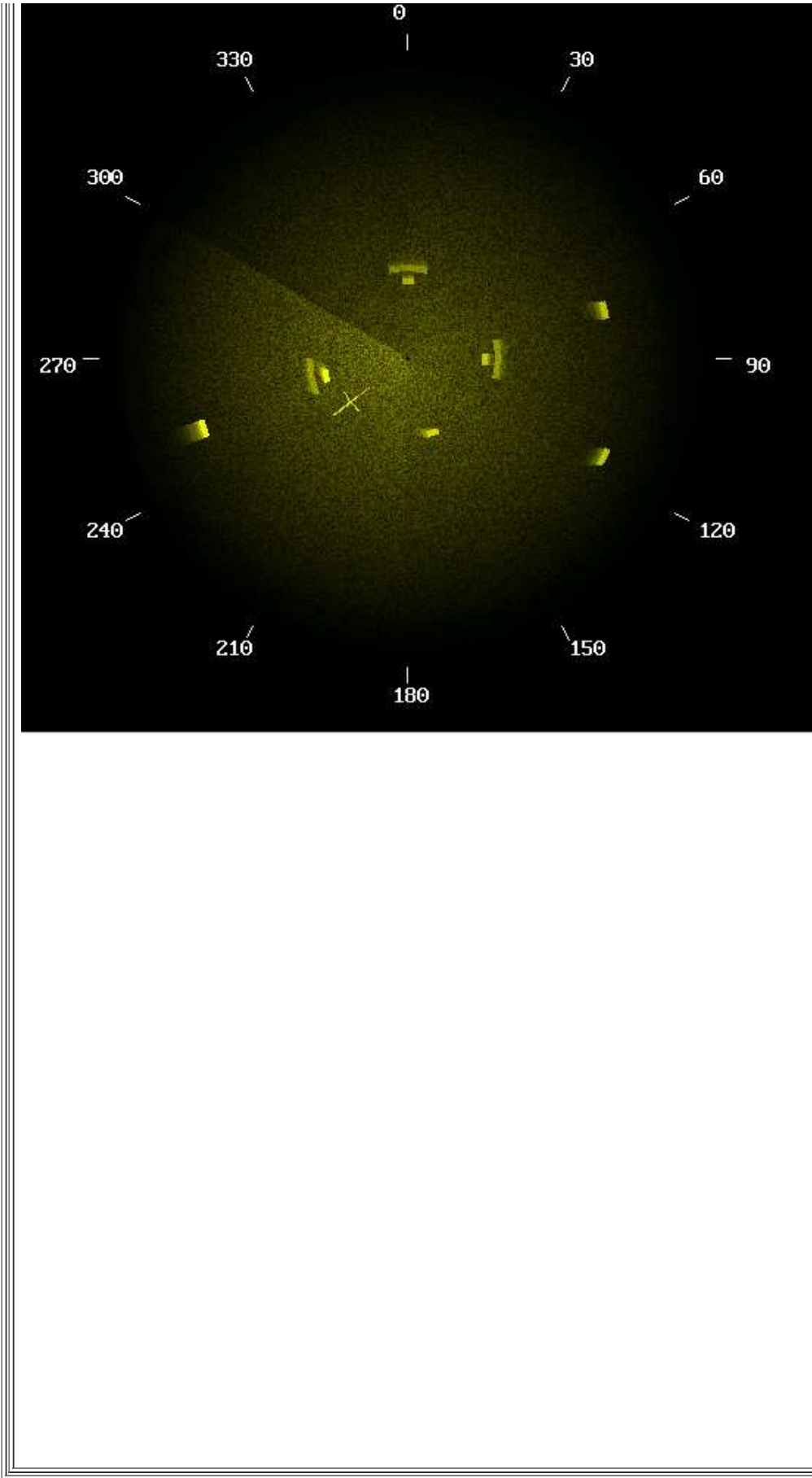
|   |  |
|---|--|
| <p>I have programmed a simulation of some of the sights and controls of the IFC (Integrated Fire Control) area of a Nike Hercules site in action against simulated targets, with some friendly aircraft (with IFF) flying about.</p>  |   |
| <p><a href="#">Jan Mølgaard</a> e-mails <i>(about the previous, hard to set up version)</i><br/> Hi Ed.<br/> I just want to thank you for the ‘nice simulator’, you made.<br/> I was a TTR/MTR operator in RDAF (Royal Danish Air Force) SQN 533 about 1980, and yes the simulator brings back a lot of memories.<br/> SQN 533, was in the ‘front line’ of the cold war, only 75 Km from East Germany air space, so we often maintained a high state of readiness.<br/> Once in a while I think back, and wonder how lucky we were, the cold war could [ have on ] a number of occasions have been really really hot.</p> |  |
|    | <p>We are assuming this siren has called the on-duty IFC personnel "to arms". The Launcher Area has a similar siren.</p> <p>Press <a href="#">HERE</a> for a siren sound.<br/> - from <a href="#">Thomas Wiegleb</a> who says he found the sound on this web site.</p> |
|    | <p>In both the Battery Control Van and the Radar Control Vans, the site status is prominently displayed - this image portrays "RED" status. A missile cannot be fired from the BC van unless the status is "RED".</p>  |

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- [Target Assignment](#) - currently out of tracking range
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- [Launch plus 3 seconds](#)
- [Launch plus 33 seconds](#)
- [Launch plus 96 seconds](#) - BURST

## Target Assignment - currently out of tracking range

|  |  |
|--|--|
|  | <p>This is the PPI (Plan Position Indicator)</p> |
|--|--|



radar display before tracking an aircraft.

This is in the Battery Control Van for the Battery Control Officer (and Acquisition Operator) The Nike site is in the center.

The white degree marks ( 0 = north) are on the bezel surrounding the scope.

Note the fast moving incoming aircraft, at about 250 degrees. There is no IFF arc behind it from a challenge

Head Quarters has assigned this target for us to attack.

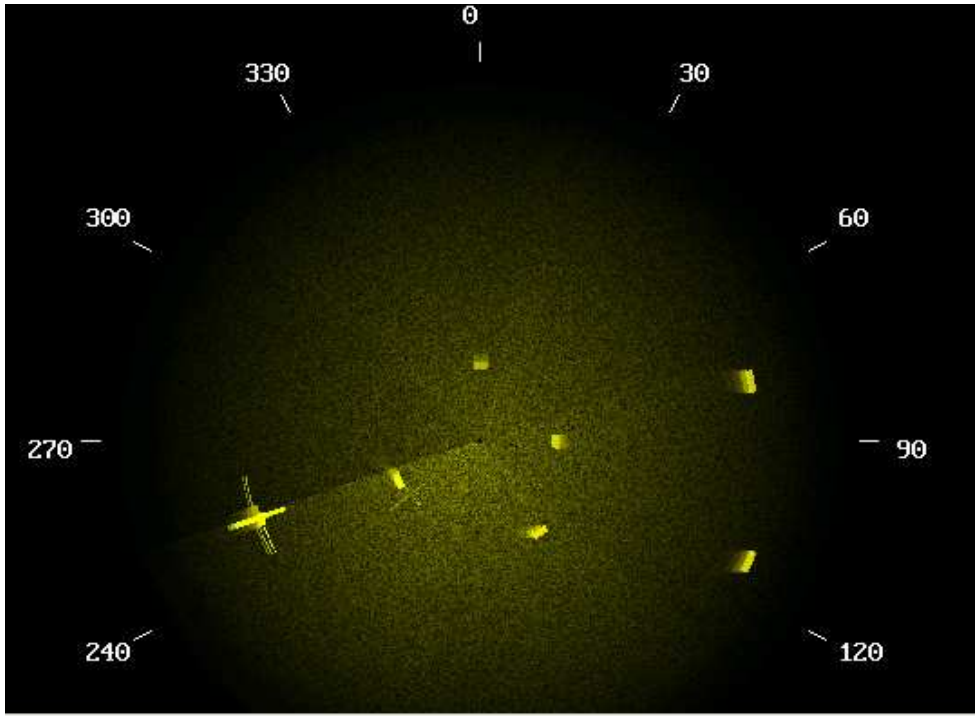
We designate this aircraft to the Target Tracking Radar to track when it gets into range.

### Tracking the target



This is the PPI showing tracking our assigned aircraft.

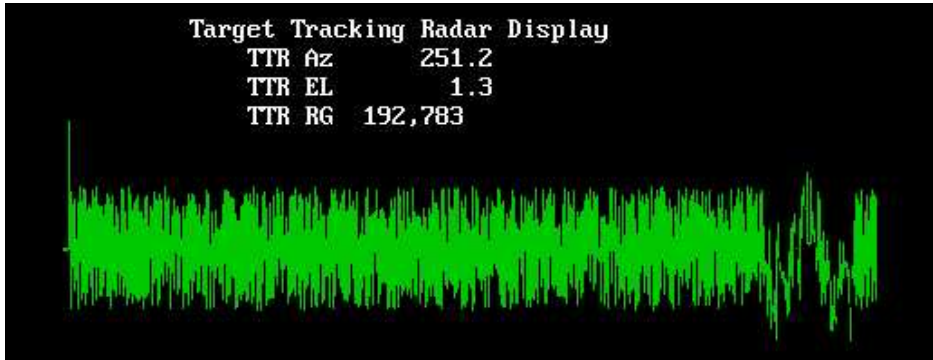
The Nike site is in the



center.

The target has the Target Tracking Radar cross on the target. Target information is going into the computer.

Note that the IFF indications have faded from the long persistence scope.



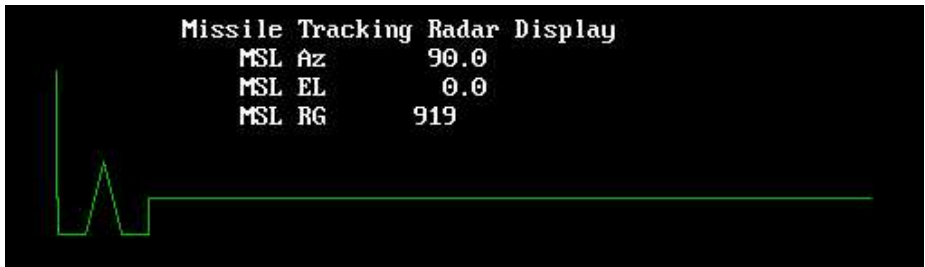
This is what the Target Tracking radar operators (in the Radar Control van) see while tracking that aircraft at maximum range.

Zero distance (with the big magnetron pulse) is at the left

The target aircraft is in the expanded tracking "notch" to the right.

The "grass" is due to lots of noise due to weak signal at maximum range.

The white printing is simulated values on the operator dials. (no white printing on the radar scope ;-))



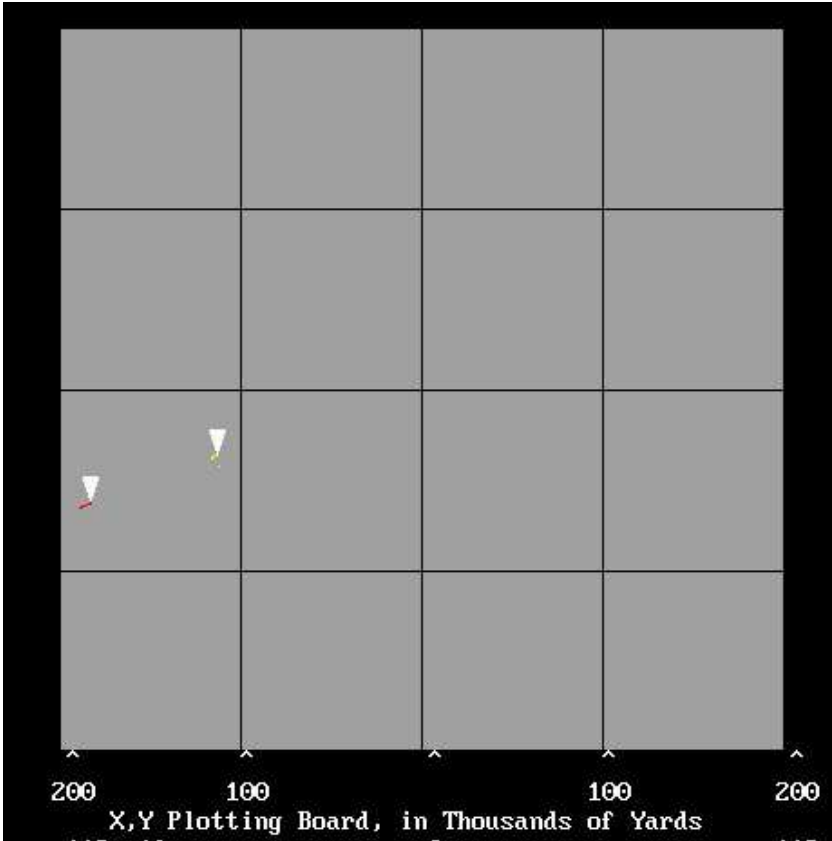
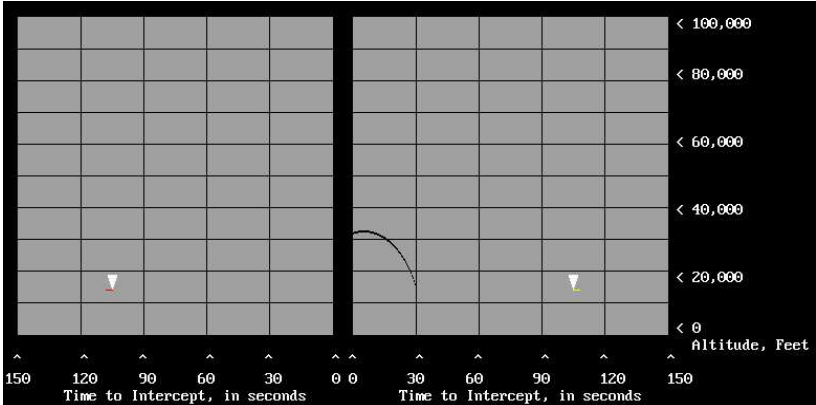
This is what the Missile Tracking radar operator (also in the Radar Control van) sees. The Missile Tracking radar is locked on the selected missile in the Launching Area.

Zero distance (with the big magnetron pulse) is at the left

The missile echo is in the expanded tracking "notch" near the left.

Note: No "grass". A 400 watt magnetron in the missile gives LOTS of signal.

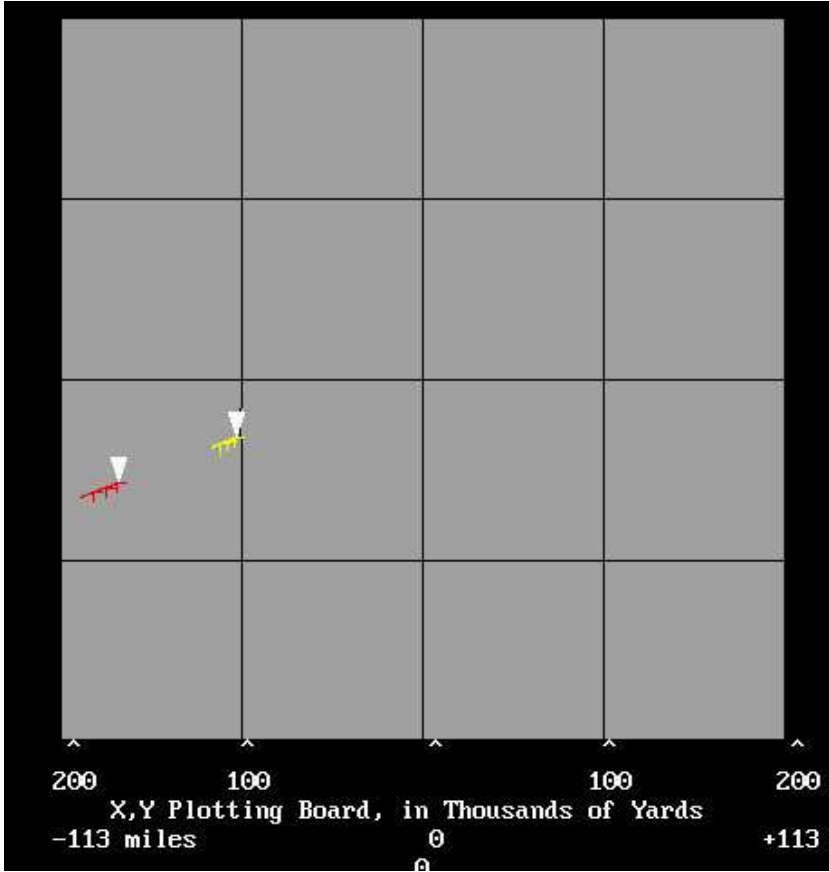
Again, The white printing is simulated values on the operator

|   |  |
|---|--|
|  <p>A horizontal plotting board with a 4x4 grid. The x-axis is labeled 'X,Y Plotting Board, in Thousands of Yards' with values 200, 100, 100, 200 from left to right. A red triangle (target) is at approximately (180, 180) and a yellow triangle (predicted intercept point) is at approximately (120, 220).</p>   | <p>dials. (no white printing on the radar scope ;-))</p> <p>This is the Horizontal Plotting board in the Battery Control van.</p> <p>The Nike site is in the center.</p> <p>The Target Tracking Radar has been supplying tracking data to computer.</p> <p>One pen (little white triangle in the simulation) tracks the target (red ink in the simulation). Every 10 seconds a horizontal and vertical jiggle show timing. Tracking has just started on this target, no 10 second marks.</p> <p>The other pen tracks the Predicted Intercept Point (shown in yellow ink)</p> <p>In real life, all the ink is green, and lamps tell which pen is tracking what.</p> |
|  <p>A vertical plotting board with two side-by-side grids. The y-axis is labeled 'Altitude, Feet' with values &lt; 0, &lt; 20,000, &lt; 40,000, &lt; 60,000, &lt; 80,000, &lt; 100,000. The x-axis is labeled 'Time to Intercept, in seconds' with values 150, 120, 90, 60, 30, 0 0, 30, 60, 90, 120, 150. The left grid shows a red triangle at (120, 15000). The right grid shows a yellow triangle at (120, 15000) and a black arc from (0, 0) to (30, 15000).</p> | <p>This is the Vertical Plotting Board while tracking an aircraft.</p> <p>Time Zero (Intercept) is in the center.</p> <p>The Left Board always plots Target Altitude vs Time to Intercept. The target's altitude is a bout 15,000 feet. Predicted Time to Intercept (if we fire right now) is about 105 seconds.</p> <p>The Right Board (before launch) plots the Predicted Intercept altitude vs Time to Intercept</p> <p>The Nike system cannot hit targets under the black arc, the "dead zone".</p>  |

We have been tracking the target for 30 seconds

The radar displays look quite similar to the above  
so we will point out differences of computer generated information.

|  |  |
|--|--|
|  | <p>This is the Horizontal Plotting board in the Battery Control van.</p> |
|--|--|



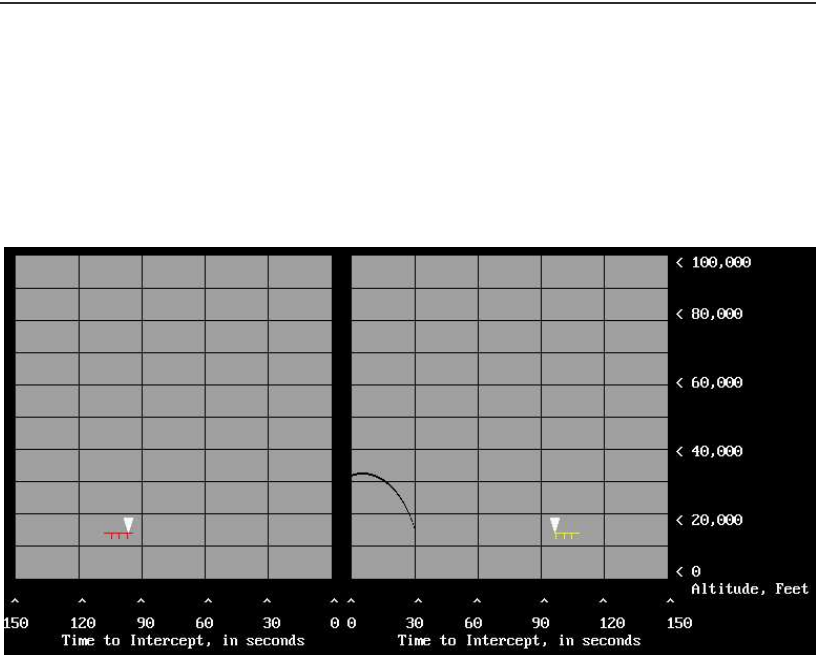
The Nike site is in the center.

The Target Tracking Radar has been supplying tracking data to computer.

One pen (red ink in the simulation) tracks the target. Every 10 seconds a horizontal and vertical jiggle show timing. Three jiggles on each track shows three 10 second timing marks.

The other pen tracks the Predicted Intercept Point (shown in yellow ink)

In real life, all the ink is green, and lamps tell which pen is tracking what.



This is the Vertical Plotting Board while tracking an aircraft.

Time Zero (Intercept) is in the center.

The Left Board always plots Target Altitude vs Time to Intercept. The target's altitude is a bout 15,000 feet. Predicted Time to Intercept (if we fire right now) is about 105 seconds.

The Right Board (before launch) plots the Predicted Intercept altitude vs Time to Intercept

10 second timing marks are used on this plotting board also.

This is a simulation of data available to the Battery Control Officer now (after 30 seconds of tracking). Actually


SYSTEM STATUS

|                        |     |                    |           |
|------------------------|-----|--------------------|-----------|
| Target Designated      | YES | Sel Sctn # 1       | Lnchr # 2 |
| Target Tracked         | YES | Msl Status         | Ready     |
| Computer Settled       | YES | Pred Intercept sec | 96        |
| Site Alert Status RED? | YES | MSL Gyro Degrees   | 252       |
| Missile Selected       | YES | Flight Time        | 0         |
|                        |     | Tgt Gnd MPH        | 1461      |
| Ready to Fire ?        | YES | Missile MPH        | 0         |

the data is available immediately after Target Tracked and Computer Settled (about 3 seconds after Target Tracked)

The missile has a gyroscope to indicate which way is down. This must be set to the Predicted Intercept Point before launch.

Launch Simulation - in the Battery Control Van

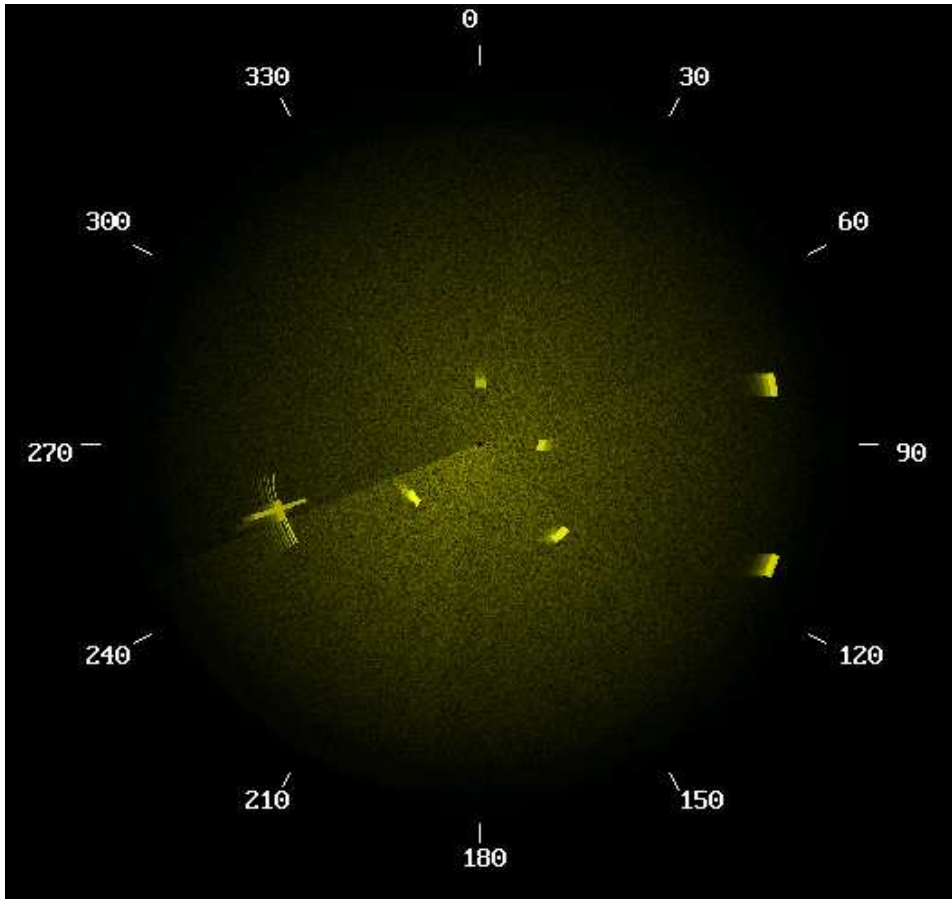


This simulated button is actually a switch covered by a red plastic shield to eliminate any accidental operation.

Any nuclear warhead protective systems and mechanisms are in the Launcher Area.

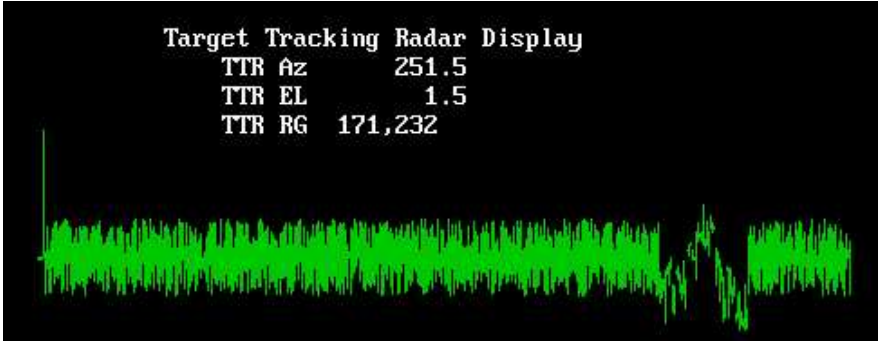
Launch plus 3 seconds

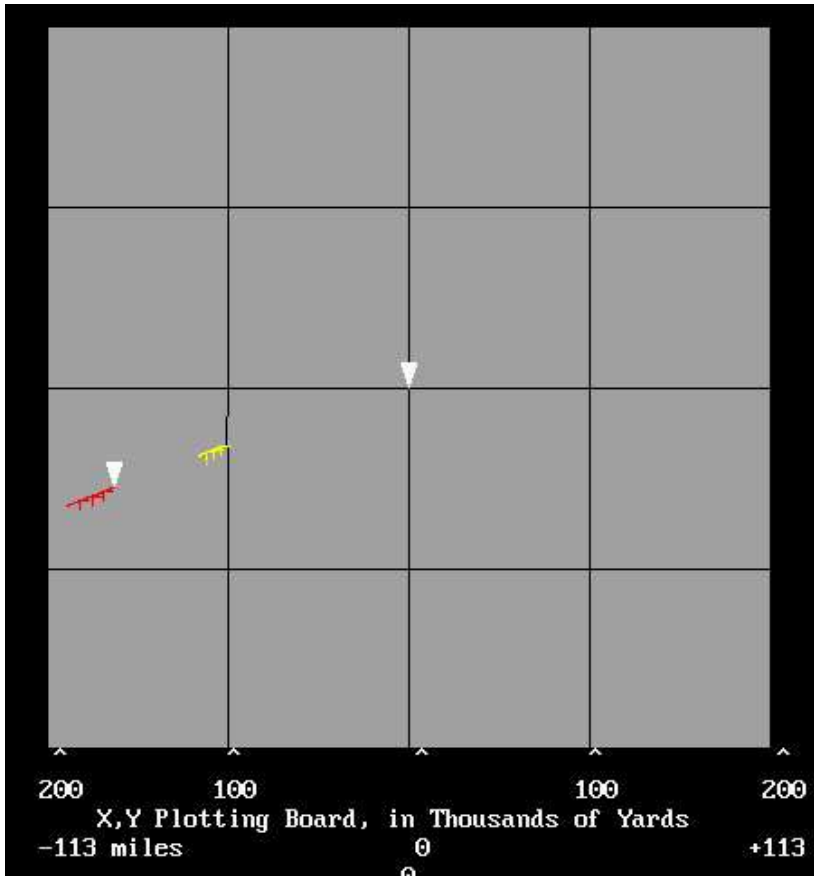
As a refresher, we will see all of the displays again and observe differences.



This is the PPI showing tracking our assigned aircraft. The Nike site is in the center. The target has the Target Tracking Radar cross on the target. Target information is going into the computer. Note that the IFF indications have faded from the long



|   |  |
|---|--|
|   | <p>persistence scope.</p>  |
|  | <p>This is what the Target Tracking radar operators (in the Radar Control van) see while tracking that aircraft at maximum range. Zero distance (with the big magnetron pulse) is at the left</p> <p>The target aircraft is in the expanded tracking "notch" to the right.</p> <p>The "grass" is due to lots of noise due to weak signal at maximum range.</p> <p>The white printing is simulated values on the operator dials. (no white printing on the radar scope ;-))</p> |
|   | <p>The missile display is about the same as prelaunch</p>  |
|   | <p>This is the Horizontal Plotting</p>   |



board in the Battery Control van.

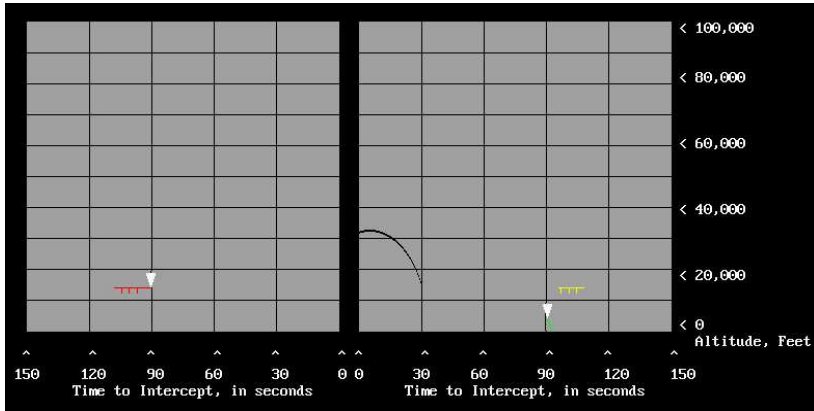
The Nike site is in the center.

The Target Tracking Radar has been supplying tracking data to computer.

One pen (red ink in the simulation) tracks the target. Every 10 seconds a horizontal and vertical jiggle show timing.

The other pen now tracks the missile (at the center) with green "ink"

In real life, all the ink is green, and lamps tell which pen is tracking what.



This is the Vertical Plotting Board just after launching a missile.

Time Zero (Intercept) is in the center.

The Left Board always plots Target Altitude vs Time to

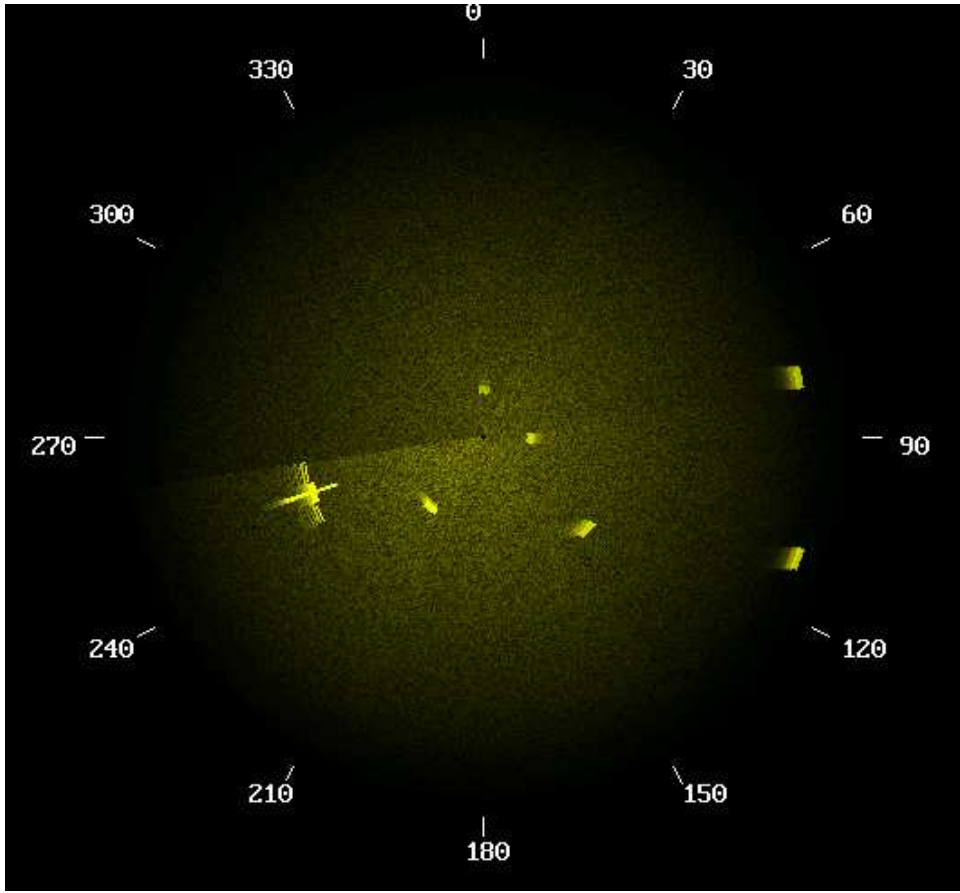


|  |   |
|--|---|
|  | <p>Intercept.<br/>The target's altitude is a bout 15,000 feet. Predicted Time to Intercept is about 90 seconds.</p> <p>The Right Board (after launch) plots the missile altitude vs Time to Intercept</p> |
| <div><div>SYSTEM STATUS</div><div><div>Target Designated</div><div>YES</div><div>Sel Sctn # 1 Lnchr # 3</div></div><div><div>Target Tracked</div><div>YES</div><div>Msl Status <span>Away, Boost</span></div></div><div><div>Computer Settled</div><div>YES</div><div>Pred Intercept sec 90</div></div><div><div>Site Alert Status RED?</div><div>YES</div><div>MSL Gyro Degrees 253</div></div><div><div>Missile Selected</div><div>YES</div><div>Flight Time 3</div></div><div><div>Ready to Fire ?</div><div>YES</div><div>Tgt Gnd MPH 1461</div></div><div><div></div><div></div><div>Missile MPH 1636</div></div></div> | <p>This is a simulation of data available to the Battery Control Officer now.</p> <p>Note that the missile status is "Away", and is being boosted</p>   |

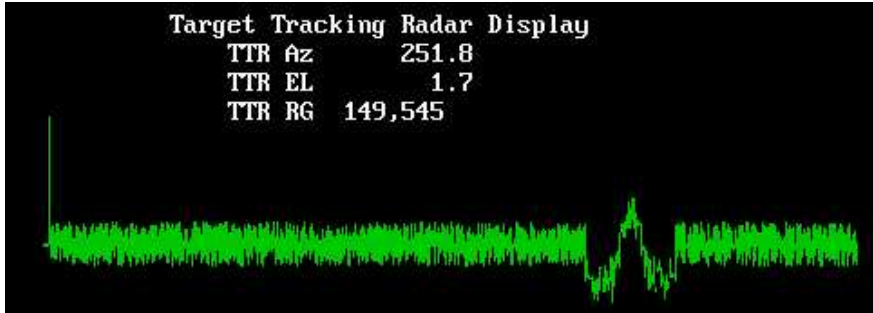
Launch plus 33 seconds

As a refresher, we will see all of the displays again and observe differences.

|  |  |
|--|--|
|  | <p>This is the PPI showing tracking our assigned aircraft.</p> <p>The Nike site is in the center.</p> <p>The target has the Target Tracking Radar cross on the target. Target information is going into the computer.</p> <p>Note that the IFF indications</p> |
|--|--|



have faded from the long persistence scope.



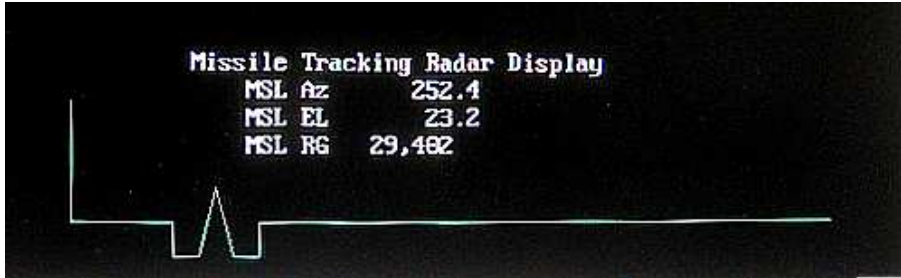
This is what the Target Tracking radar operators (in the Radar Control van) see while tracking that aircraft at maximum range.

Zero distance (with the big magnetron pulse) is at the left

The target aircraft is in the expanded tracking "notch" to the right.

The "grass" (noise) is decreasing due to decreasing range.

The white printing is simulated values on the operator dials. (no white printing on the radar scope ;-))

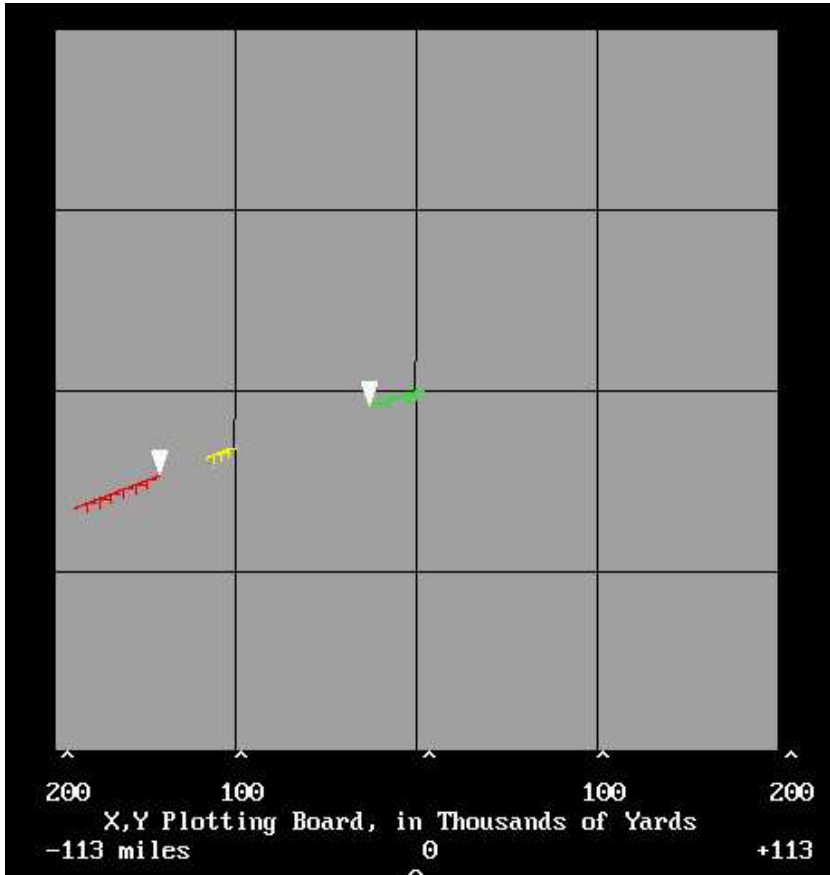


This is what the Missile Tracking radar operator (in the Radar Control van) sees while tracking that aircraft at maximum range.

Zero distance (with the big magnetron pulse) is at the left

The missile is down range, at an elevation angle of 23.2 degrees

The white printing is simulated values on the operator dials. (no white printing on the radar scope ;-))



This is the Horizontal Plotting board in the Battery Control van.

The Nike site is in the center.

The Target Tracking Radar has been supplying tracking data to computer.

One pen (red ink in the simulation) tracks the target. Every 10 seconds a horizontal and vertical jiggle show timing. Tracking has just started on this target, no 10 second marks.

The other pen now tracks the missile (at the center) with green "ink"

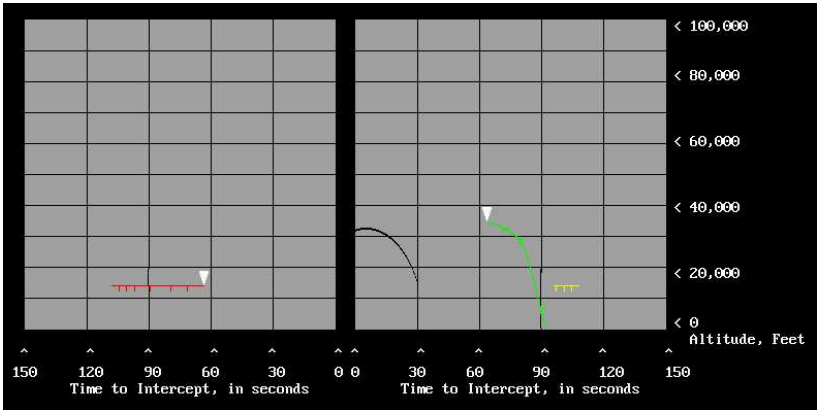
In real life, the ink is green, and lamps tell which pen is tracking what.

This is the Vertical Plotting Board 30 seconds after the missile launch.

Time Zero (Intercept) is in the center.

The Left Board always plots Target Altitude vs Time to Intercept. The target's altitude is a bout 15,000 feet. Predicted Time to Intercept (if we fire right now) is about 60 seconds.

The Right Board (after launch) plots the missile altitude vs Time to Intercept



This is a simulation of data available to the Battery Control Officer now.

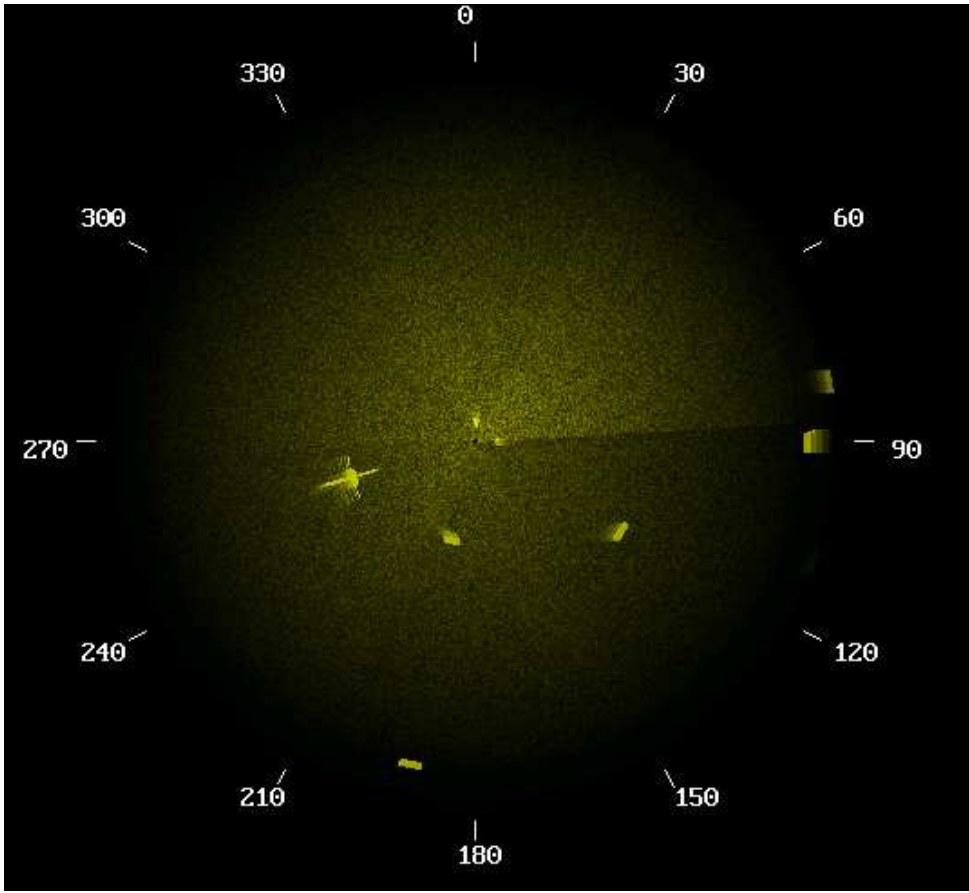
Note that the missile guidance/status is now in the 1/2 g cruise mode. 1/2 g is a good compromise between good missile range and quick time to target.

| SYSTEM STATUS          |     |                    |             |
|------------------------|-----|--------------------|-------------|
| Target Designated      | YES | Sel Sctn # 1       | Lnchr # 3   |
| Target Tracked         | YES | Msl Status         | 1/2g Cruise |
| Computer Settled       | YES | Pred Intercept sec | 63          |
| Site Alert Status RED? | YES | MSL Gyro Degrees   | 253         |
| Missile Selected       | YES | Flight Time        | 33          |
| Ready to Fire ?        |     | Tgt Gnd MPH        | 1461        |
|                        |     | Missile MPH        | 2470        |

Launch plus 96 seconds - BURST

As a refresher, we will see the displays again and observe differences.

This is the



PPI showing tracking our assigned aircraft.

The Nike site is in the center.

The target has the Target Tracking Radar cross on the target. Target information is going into the computer.

Note that the aircraft is much closer to "us".



This is what the Target Tracking radar operators (in the Radar Control van) see at this time.

Zero distance (with the big magnetron pulse) is at the left

The target aircraft is in the expanded tracking "notch" to the right.

The "grass" (noise) is much reduced due to the decreased range.

The white printing is simulated values on

the operator  
dials. (no  
white  
printing on  
the radar  
scope ;-))

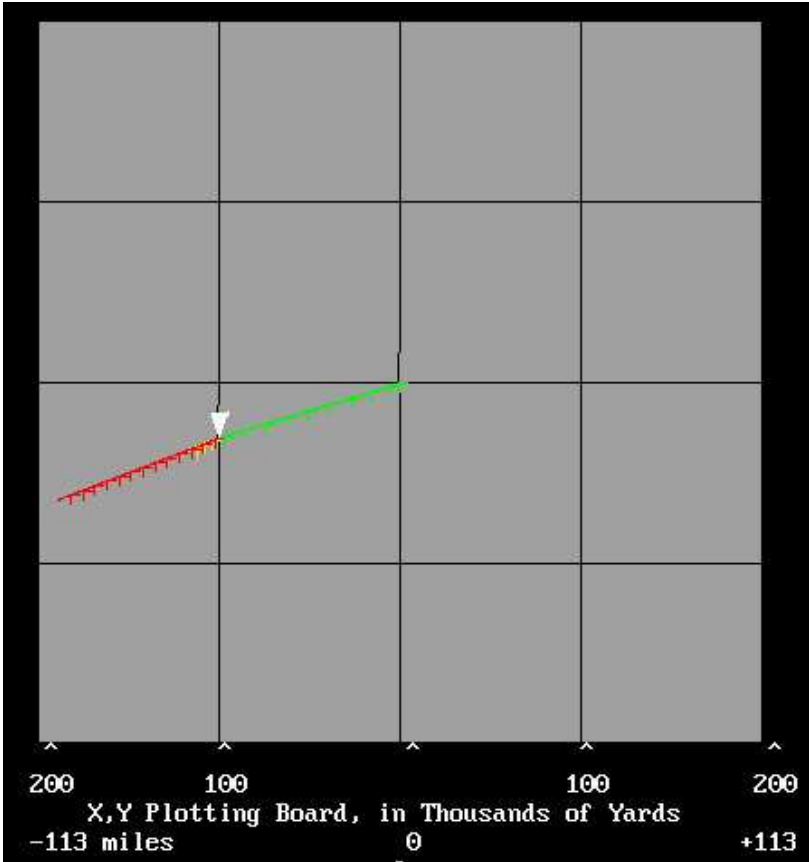
This is the  
Horizontal  
Plotting  
board in the  
Battery  
Control van.  
The Nike  
site is in the  
center.

The  
Target  
Tracking  
Radar has  
been  
supplying  
tracking  
data to  
computer.

One pen  
(red ink in  
the  
simulation)  
tracks the  
target.  
Every 10  
seconds a  
horizontal  
and vertical  
jiggle show  
timing.

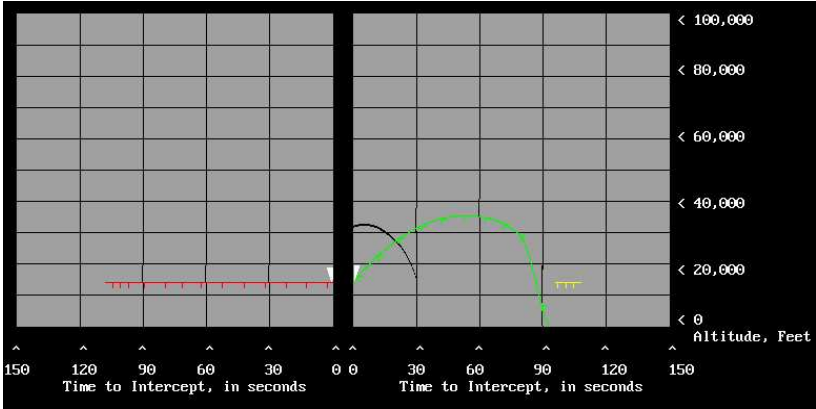
The other  
pen now  
tracks the  
missile (at  
the center)  
with green  
"ink". The  
target and  
the missile  
are now at  
the same  
point in  
space.

In real  
life, the ink  
is green,  
and lamps  
tell which  
pen is  
tracking  
what.



This is the  
Vertical  
Plotting  
Board while  
tracking an





aircraft.  
Time  
Zero  
(Intercept)  
is in the  
center.  
The Left  
Board  
always plots  
Target  
Altitude vs  
Time to  
Intercept.  
The target's  
altitude is a  
bout 15,000  
feet.  
Predicted  
Time to  
Intercept is  
0, the Burst  
Command  
was given  
about 105  
milliseconds  
ago.  
The  
Right Board  
(after  
launch)  
plots the  
missile  
altitude vs  
Time to  
Intercept

| SYSTEM STATUS                                  |     |                       |       |
|--|-----|-----------------------|-------|
| Target Designated                              | YES | Sel Scn # 1 Lnchr # 3 |       |
| Target Tracked                                 | YES | Msl Status            | Burst |
| Computer Settled                               | YES | Pred Intercept sec    | 0     |
| Site Alert Status RED?                         | YES | MSL Gyro Degrees      | 253   |
| Missile Selected                               | YES | Flight Time           | 96    |
|  |     | Tgt Gnd MPH           | 1461  |
| Ready to Fire ?                                | YES | Missile MPH           | 0     |
| Miss distance yards X= 25 Y= 7 Z= 4 Radius= 26 |     |                       |       |

This is a  
simulation  
of data  
available to  
the Battery  
Control  
Officer now.  
Note that  
the missile  
status is  
"BURST".  
The  
distances  
are  
estimates,  
and depend  
heavily on  
correct  
system  
orientation  
adjustments  
and missile  
response to  
commands.

Battery Control Van simulation, with a click of your mouse:-))

Sept 26, 2018

[Click here](#) to start the Battery Control Van simulation of this Nike "Game".

- It uses the JavaScript engine in this browser, converted on-line from BASIC code using Brad Nelson's translator.
- Works with Windows 7, 10 with Internet Explorer, FireFox or Chrome browsers.
- Also Apple MacBook Air with FireFox. Safari 10.1.2 is too slow -
- Does not seem to run at all under Windows 10 Edge browse (error message), not tested under Unix, Linux, ...
- The tracking radar displays have been deleted. Runs a little jerkily on slower machines.

This is (mostly) the Battery Control Officer's view of a Nike vs aircraft "engagement"  
The Battery Control Officer:

- Does not see or hear actual missiles, nor see tracking radar displays
- Interacts using head sets with tracking radar people, launcher people,
- Interacts directly with the acquisition radar operator, computer operator, telephone switchboard operator
- Interacts higher HQ via electronic displays on the PPI scope ?and voice?
- Sees the displays presented here, and operating target selection and a few other controls presented here

A few things are not displayed:

- Jamming, we have enough excitement already
- Plan Position Indicator (PPI) range switch
- Moving Target Indicator (MTI) switch or operation

To understand the displays and operations, see the rest of this document.

Quick operating instructions: Use the mouse as pointer and left button to click:

1. To see the results of Identification Friend or Foe (IFF) challenge, press and left button hold "IFF Mode 1" one complete acquisition radar sweep around. When activated, the pale yellow button turns bright yellow.
2. To designate a target for tracking with the Target Tracking Radar (TTR), click on the target. If the TTR cannot track the target, green target tracked, the target may be out\_of\_range, or mouse not aligned correctly. When target is being tracked, a "tracking cross" follows on the target. The cross is one short radial line and one short arc centered on the target.
3. While a target is being tracked by the TTR, the plotting boards are active. Red is the target, Yellow is Predicted Point of Intercept, Green is the missile.
4. To launch a missile while a target is being tracked, click on the "FIRE" button. If the predicted point of Intercept is in range, the missile will be launched. The green is the missile. The tick marks are 10 second interval markers.
5. If you want to destroy the missile, say the target turns out to be a friend, click on the red "Manual Burst". the missile is gone and you are in pre-launch mode again.
6. If you click "Auto" at the top, the "game" plays automatically - challenging with IFF, designating targets, shooting down most all "unfriendly" aircraft -

For questions or comments, e-mail [ed@ed-thelen.org](mailto:ed@ed-thelen.org)